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VOL. XIII, No. 10. MAY 11, 1916

THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

SCIENCE AND EPISTEMOLOGY

SINCE the birth of epistemology, science has found little support in philosophy for the affirmed existence of objective truth. By objective truth we commonly denote, as I understand it, a truth in the production of which the psychophysical individual is in no way involved. But epistemology, grounded as it is in psychology, has in this very fact made the existence of an objective truth for epistemology a sheer contradiction. Its sensationalistic principle has been turned and twisted in many a way, since the days of Berkeley, to surmount the limitation. But with a clear knowledge of what is implied by objective truth, ought we not frankly to admit that a *proof* of an objective truth from the standpoint of epistemology is one that has not yet made its appearance upon the evidence of facts that are at once clear and convincing?

The situation is a curious one. There is no truth, says the epistemologist, in the existence of which the psychophysical individual fails to be effectively involved. The physical scientists, on the contrary, have as persistently subscribed to an order of truth from the production of which the psychophysical individual stands excluded. By the aid of some obvious facts, hitherto overlooked, I think I have achieved the solution of this conflict along lines calculated to appeal to scientists and epistemologists alike.

My argument will rest upon the truth of several principles extracted from the field of science. The principles are those (*a*) of general dependence and (*b*) of uniform behavior in nature, which, taken together, yield a revised form of relativity. Under the term "pluralism," I shall embrace such additional principles from the methods of science as (*c*) disconnections and (*d*) ultimate differences or heterogeneity. As these principles in this conjunction have already been given a full elaboration by me in a series of publications, I shall, after a brief and more completely organized statement of them, confine my attention in this paper to an exposition of the thesis that the psychophysical individual is *not* involved at every point in the determination of reality.

I

Relativity and pluralism are so closely bound up with each other that I shall not, in a statement confessedly abridged, deal with them separately.

The idea most central to relativity is that of dependence. But the idea of relativity involves other specific ideas as well. The fault with philosophy in large measure is a matter of oversight in the correlation of these ideas. But how are we to set about supplying the deficiencies? There is but one way open to us. In the first place, it remains for us to note whether, and if so where, relativity has been given a constructive scope; particularly as the scope granted to it in the past by philosophy has been mainly destructive. In the second place, attention should be directed to a complete analysis of relativity when in its constructive operation.

The first inquiry may be satisfied at once: relativity is the most central idea involved in the methods and in the results of science. A conscious identification of relativity (as it existed in philosophy) with the scientific principles of general dependence marks, accordingly, the first radical step that has been taken in the solution of the problem, and, since my initial[1] presentation of the matter, has been apparently adopted in several quarters. In philosophy the notion of relativity without an exception presented a very abridged conception. Is it any wonder, then, that the scope of its operation in philosophy should have remained of a doubtful value? On the contrary, if we accept the method and the results of science, we must admit that science can not take a single step which does not involve the principle of relativity. It must, therefore, be the principle *par excellence* in the determination of truth.

In answer to the second inquiry, it may be stated in advance of an analysis, that the correlated ideas of which philosophy, unlike science, failed to give regard *in their specific bearing upon relativity* are, (*a*) uniform action in the behavior of objects, and (*b*) pluralism, as involving disconnections and heterogeneity.

That dependence is a principle fundamental to all science, may be accepted, I dare say, without dispute. Offer science any object or event and science at once sets about to lay bare the relevant conditions (objects) involved in the existence of the presented object or event. But the fact to be emphasized is not merely *dependence,* but *relevant* dependence. Hence, with science, a given fact is not dependent upon *all* other facts, but only upon *some* other facts. In regard to other so-called irrelevant facts, the given object is affirmed to be *in*dependent. Relativity in its philosophical formulation, however, has failed to embody such irrelevancy or disconnections with the idea

[1] "Locke a Constructive Relativist."

of dependence, although in science the existence of disconnections, as is evident, is as essential in the discovery of truth as the existence of dependence. These two principles, in science, are coequal in function; and if coequal in function, they are coequal in metaphysical rank. Philosophy, therefore, no matter what its speculative tendency may be, is denied the right to relegate either disconnections (independence) or connections (dependence) to the background. To divorce them, or to exalt the one to the exclusion of the other as metaphysically more ultimate, is to forget, for example, that a disconnection between two objects in chemistry remains a disconnection *in chemistry* even though other kinds of relations may be established between such chemically disconnected objects. In addition to these chemical disconnections, each of the extra-chemical relations in turn would have its own specific quota of disconnections. Empirically considered, therefore, pluralism in the form of disconnections presents an ultimate phase of reality, one that is incapable of transcendence,[2] however varied or numerous the connections may be that are elicited in our investigation of any part of reality. At the same time, it is to be affirmed that connections are equally fundamental to reality. We infer the existence of connections whenever change manifests itself in a specific group of objects brought into an effective conjunction.[3] Accordingly, it is with the recognized existence of a *change* of one type or another that the various causal sciences originate. Thus a chemical change *versus* a mechanical one, when accepted as a certain type of result, gives us the *basis* for an organization among one type of objects (chemistry); the distinction between the beautiful and the ugly, another form of a recognizable result, yields another basis for an organization of our objects (esthetics); and so on indefinitely as we pass from one basis or general distinction in human experience to another, whether practical or theoretical. *The point of departure in each case is the accepted result,*[4] *whether simple or complex.* The result in turn determines the measure and

[2] To have recourse to a trans-empirical principle to enforce an ultimate unity is without avail; for in a sphere of fanciful speculation the conclusion that pluralism is ultimate is in no way a less valid assumption than the opposite assumption of an absolute unity or homogeneity. I, however, deny to philosophers the rightful abandonment of the methods and the results of science for dreams, unless a competition at the outset with Grimm and Andersen is also openly declared on the part of a philosopher.

[3] By making *change* the distinguishing mark between a causal and a non-causal situation, it is made possible to invest the word "relation" with a more specific meaning, and to offer a proof for an *objective causation.* See this JOURNAL, Vol. XI., page 655, for a fuller elaboration of this contention.

[4] And the point of departure, except possibly for psychology, is not the psychological immediacy, whatever the form in which it has been so commonly proclaimed.

period.

boundary of the objects constituting its conditions and, like the result, these may be either simple or complex. Accordingly, when I make lemonade I do not combine elements that are simple from the standpoint of chemistry, but I combine the complex thing, water, with the complex things, sugar and lemon juice. From the standpoint of lemonade, they are ultimate.[5] On the other hand, the so-called elementary substances (hydrogen and oxygen) are ultimate in reference to their capacity to produce water, just as the electrons may be ultimate in respect to their peculiar capacity to produce other specific results. The *conditioning* objects in each case are ultimate in their determination by virtue of the fact that a restricted and special set of conditions is peculiarly requisite for the production of a certain specific result; and the *resulting* object is ultimate in its determination, (*a*) for the reason that it may function as a condition in some other context of human experience; or (*b*) for the reason that it is relatively unique and incommensurable[6] (heterogeneous). In this account, the principles found to be unfailingly present with the principle of dependence or connection are: (1) uniformity in the operation of objects; (2) disconnections; and (3) heterogeneity. I shall deal with these three additional principles in greater detail.

Under the principle of uniformity, science embraces two ideas: (*a*) that a specific set of conditions will produce a specific result, and (*b*) that this operation remains constant. *Why* phenomena should behave thus, philosophy, since Hume, makes no attempt to answer; *that* phenomena behave thus is a matter of empirical observation, although recent discussion by anti-intellectualists has rudely questioned the truth of it. In the interest of the present discussion, this challenge may be passed over.

When relativity, therefore, upon the basis of uniformity, suggests the claim that a given object reveals itself differently under different conditions, two things are of necessity implied: (1) that such operation in objects represents what is ultimate and objective, and (2) that

[5] This JOURNAL, Vol. XI., page 605. Hence, the realist in his assertion that complex things are or may be ultimate, from the presented standpoint, proves himself in possession of a bigger truth than he, left to his own reasoning, could have established. His error lies in his failure to perceive that one and the same object, under changing conditions, may either forfeit or acquire a unity, and hence, in its isolated abstraction, may be termed neither simple nor complex, one nor many.

[6] Thus, water, in respect to hydrogen and oxygen is heterogeneous. Moreover, water maintains a certain independence for the reason that it can not, except under very specific conditions, be reconverted into hydrogen and oxygen, and, only under still other specific conditions, converted into something else, as, for example, vapor or ice. Water, therefore, remains fixed in a specific determination until the relevant conditions capable of producing a change in it are supplied. This argument, accordingly, yields at least one proof for independence.

the object under consideration is of necessity a synthesis or so-called construct. Upon such ground it is easy to understand that a given object under differing conditions may combine even incompatible qualities. For instance, it is compatible with our notion of gold for it to possess a host of incompatible qualities and properties—a solid or a liquid state; red, green, or yellow; and it may, under different forms, at once have the ability and the inability to combine with an indefinite number of other substances. Each of these qualities and properties, however, in accord with the principle of uniformity, is actually present only in a specific, circumscribed situation or group of conditions. The problem thus forced to the front in the specific determination of objects, as I have already stated in full elsewhere,[7] is the one-and-the-many problem. The inherent perplexity of this problem is well known. Hence I may assume that one of the significant contributions to philosophy which this corrected form of relativity has to make is that it, by the aid of the principle of unformity, can yield the ground and proof of *a unity in objects that is objective*, whether we deal with an object of a single group of conditions or with an object that is constructed on the basis of many different groups. Thus gold, in the hand of the chemist, acquires a determination that is not only definite and specific, but as fixed in its determination as the principle of uniformity is fixed in its specific and invariable correlation of a specific result with its specific conditions. I do not, of course, claim for relativity on this point an unlimited capacity to illuminate; but I do claim for it the merit of doing for the one-and-the-many problem what no other principle has as yet succeeded in doing. Thus pragmatism, for example, has failed to meet this demand for unity in its use of such principles as "needs," "habits," "purpose," "satisfaction," "whatever works" as evasions of or as substitutions for the principle of uniformity,—terms not only subjective in their connotation, but they, in any properly organized form, are wholly within the control of the principle of uniform operation in objects. In so far, then, as relativity incorporates the idea of uniform operation in objects, it embodies a principle that is fixed, ultimate, and objective. Hence, to call uniformity itself into question, constitutes no special argument against relativity. The argument, if true, would overthrow every form of science.

In the idea, "heterogeneity," another distinct aspect of relativity comes to the surface—an aspect of objects more properly described by the wider term of pluralism. I have already dwelt sufficiently upon one aspect of pluralism—the existence of disconnections among objects,—in virtue of which property objects may be termed "neutral" or "ineffective" in respect to other specific objects. One can

[7] This JOURNAL, Vol. XI., pages 603–07.

not view without surprise the fact that this obvious commonplace of the methods of science should have escaped an appreciative understanding by philosophers expounding metaphysics.

It is another aspect of pluralism, however, to which I wish here to draw attention; namely, that fundamental differences must be assumed to inhere in objects, in virtue of which fact alone we can maintain *differences* in *results* and *differences* in *conditions*. Hence deny ultimate differences (or heterogeneity) of objects and the scientific formula in question, with its possibility for an organization of objects, vanishes. An organization of objects, upon the basis of the formula in question, primarily implies a partiality; and a partiality among objects lacking in differences that are inherent and ultimate would be a partiality without either pith or meaning. General chemistry establishes such differences as ultimate in the case of eighty or more so-called elementary substances. Physical chemistry in the number of substances considered by it as ultimate far outstrips general chemistry. And recently, the new science of colloids, another department of chemistry, has fixed upon still other aspects of reality as ultimate. This science of colloids in particular comes with an unusual enlightenment for one wearied by the monisms of philosophy. But why pause to multiply instances of the above order! For, once clearly fix upon the fact that the point of departure in any organization of objects is a given, more or less, basic *result*, and one can easily understand why the three mentioned departments in chemistry fail to conflict with or to neutralize each other. It also serves to explain the further fact why the exponents of the sciences mentioned, as a unit, should further maintain, for example, that the theory of electrons emanating from physics in no way undermines or challenges their respective sciences. The truth is, in fact, that no matter of what order the distinction *is* that lies at the basis of a specific science, provided the distinction is real, the principles of dependence and of heterogeneity remain equally implied and assumed in all scientific explanation. For, if the distinctions at the base of each science were not of a heterogeneity that is ultimate, the distinction between one science and another would be a mere makeshift. But if the distinctions at the base of any science are ultimate, then the distinctions between each of the sciences are ultimate. The danger in dealing with a problem of this kind is that we are too apt to deal with it in the abstract. Instead, let us take such a trinity of closely related sciences as general chemistry, physical chemistry, and the science of colloids, and the fact at once disclosed is that the specific properties and qualities of objects that come into existence from the standpoint of one of these sciences *cease entirely to exist* when the same general substance is dealt with from the standpoint of either of

the other two sciences. And the reason thereof is obvious: *specific* conditions are requisite for the existence of certain *specific* results. Hence, however questionable or uncertain the boundary lines may be between the three sciences in question, we do not *resolve* the one science into the other when we set about to embrace them under one term. We merely, perchance, *incorporate* them. For if we would avoid a loss of any quality or property distinctive of any one of them, it would be necessary to incorporate them in such a way that each would have its own specific groups of conditions preserved intact. But such an incorporation (in essence) would be a matter of mere addition or aggregation; it certainly would not, at bottom, be a matter of organization, that is, a unity of the type so familiar to speculative thought. The attempt, therefore, to *resolve* all of reality, let us say, into psychology (the offense of present-day epistemology) is just as blind and absurd as to resolve the whole of psychology into chemistry or physics, or all of the sciences, each with its own more or less unique and incommensurable basic distinction, into a supreme science, so-called philosophy. I shall proceed to prove that relativity, as formulated, is in a position to correct the generally accepted psychologized epistemology.

II

A little truth, observed or neglected, throws a big shadow in philosophy. It is my aim to show that a truth, hitherto unobserved, but with consequences no less significant, characterizes epistemology. Hypnotized as epistemology has been by the subject-object relation of psychology, it of necessity failed to take due note of the object-object relation; or, when epistemology chanced to take note of the latter relation, it construed the relation solely in terms of the results gleaned from the subject-object relation, as if the object-object relation had no special contributions of its own to offer. The outcome thereof is our psychologized epistemology.

A statement of a few simple facts, taken at random from chemistry, will suffice to establish my contention that *sensationalism, in whatever form, does not exhaust the cognitive elements utilized in the differentiation or determination of objects.* Kant has already shown that certain abstract ideas are thus implied in human experience. The distinctions that I shall insist upon, however, are not abstract in character, but, on the contrary, very definite and concrete. I accept Kant in this contribution to philosophy just as I, to a certain extent accept Berkeley in his formulation of perception and existence. The ideo-motor theory in the hands of pragmatists, I also accept; but I deny that the ideo-motor theory supplants Berkeley; it only serves to place the outcome of his philosophy upon a broader psychological basis than the more narrow sensationalism had already

achieved. But one set of non-sensuous distinctions has escaped detection,—the distinctions that come to exist in objects in virtue of *a variety in their operations* when they are brought into some form of a causal or non-causal relation with each other. To record such differences, as we shall see, is the central business of chemistry.

As stated in the pages preceding, reality for science is determined in circumscribed situations, in so far as we hold (*a*) to the formula that a given result is a product of specific conditions, and (b) to the principle of elimination as it is involved in all inductive reasoning. Opposed to this formula, epistemology asserts that the psychophysical individual is a factor that is not only constant, but also central in the determination of reality. Hence the question is at once raised: Is the psychophysical individual, as epistemology presents the matter, the one object that is immune to the "elimination" in question? I shall deal with the problem in the concrete.

I turn to the chemist and ask a simple question: Water is the product of what objects? He replies that hydrogen and oxygen in certain proportions, when united by an electric spark, produce water. He also informs me that when nitrogen is combined with oxygen, water will not result; nor will any other substance when combined with any other substance (except H_2O) succeed in producing water. Now grant that a psychophysical agent is present in each and every one of these situations. But how can its presence alter the matter? For the thing primarily concerning the chemist *in reference to water,* is the question whether the psychophysical agent or whether some other principle, as oxygen, nitrogen, or silver, is directly involved in the origin of water. If the psychophysical agent, rather than oxygen or hydrogen, were the determining factor, it would follow that the psychophysical agent was upon a par, and merely upon a par, with the eighty or more elementary substances which chemistry enumerates as primary in its investigations. In this case our formula for water would be: "the individual + H_2O + the electric spark." On the other hand, the formula, "the individual + nitrogen + silver" would be incorrect. But if the psychophysical agent is an unchanging coefficient in the situations which *fail to produce* the result and also in those *competent to produce* the result, what possible reason would the chemist have for regarding it as the *solely* central and significant factor in the formation of water? The distinction here between what is significant and what is negligible in the situation is too obvious for even the dullest among the chemists to confound. *In respect to the origin of water,* hydrogen and nitrogen *are different* and the psychophysical agent *is neutral,* the facts are obvious. What, then, are we to say of a doctrine that affirms that the psychophysical agent is the primary and solely sig-

nificant factor in the given situation? The psychophysical agent *in respect to the given result* is neutral, in the first place, for the reason that it is not "effectively" involved in the production of the specific result: and, in the second place, for the further reason that the *type of differences,* instanced by hydrogen and nitrogen in respect to water, *is of a strictly non-sensational order,* distinctions, both of them hitherto unregarded by epistemology. The chemist, therefore, would not have been justified in following the epistemologist in so patent an oversight of chemistry's own special problems and distinctions. Thus in a manner akin to his necessitated indifference to psychology and epistemology, the chemist is inclined to ignore a mere mechanical mixture as over against a chemical one; or again, he is inclined to ignore the shape and size of bodies as over against their merely substantive character. Accordingly, we find in every text-book in chemistry that the shape and size of objects are deliberately excluded from its field, on the strength of their irrelevancy to its specific subject-matter. Why, then, should not the chemist, upon even more established ground, have felt himself safe in excluding the boasted claims of epistemology? The failure of epistemology to investigate the object-object relation explains its incapacity to give proof and meaning to the notions of *independence* and of *non-sensational differences* in objects. It also explains the fact why the more or less objective principles and distinctions, for which chemistry in its turn most specifically stands, failed to receive a proper recognition in philosophy. The muddle thus induced by epistemologists in the sphere of chemistry, however, served less to confuse than to disgust the chemist with the arrogant claims of epistemology. The chemist's repudiation of epistemology now proves to have been a sound one. For when once the chemist has accepted a chemical change as a *type of change* that is distinctive, the only principles that he is validly called upon to recognize are (*a*) that a given so-called chemical result is the product of certain specific conditions. These conditions in turn become disentangled and organized. And in so far as he thus simultaneously adheres to his special type of change and to this principle, the only other principle to which he is called upon to adhere to is (*b*) that those conditions that are present when the phenomenon is present and absent when the phenomenon is absent are the solely central and significant conditions in the production of a given phenomenon. Generalizing, then, we may conclude that science is correct in its claim that the individual is not of necessity involved in the determination of all reality; and its claim remains correct to the extent in which science can find, and thus come to deal with, *objects whose interaction with each other is of more primary*

concern than their interaction with a psychophysical organism. The physical sciences as a whole stand for the former type of interaction, and, in their results, they have come to exemplify principles that maintain *an independence of the psychophysical organism in their operation.* Nor does the fact that a psychophysical organism is a factor that is present in each and every situation under investigation in any way supplant the distinction that hydrogen and nitrogen *act differently in respect to water,* and are therefore *significantly different,* not in color, weight, or some other sensational quality, but *in operation in respect to water.* The type of differences in question is, of course, revealed to us in consciousness, but it is not revealed in terms of the psychophysical. The whole issue centers in this distinction.

It is true that the elementary substances of chemistry may and do become identified and differentiated within principles that are obviously psychological (sensational) in character. But the other fact remains equally patent, that they acquire a further differentiation and organization in harmony with principles that are in no way to be classed as psychological. I have already sufficiently enlarged upon such non-sensuous principles in connection with independence *versus* dependence and in connection with the varying capacity in so-called different objects to aid in producing a given result, or to fail to thus operate. And, what is more, the existence of such non-sensuous principles must be accepted, until we become able, if ever, to tell in psychological terms *why* hydrogen and oxygen in certain proportions will produce water and *why* other objects fail to do so.[8] All we are permitted to say is that hydrogen and oxygen will produce water; oxygen combined with nitrogen will not do so. Here, then, as clearly indicated, *are differences in the operation of objects* which we, as philosophers, ought not to have overlooked. The oversight is all the more puzzling, because the distinctions concerned are so very simple and obvious in their statement, and, at the same time, so central in a science no less eminently concrete than chemistry. In their contrast to psychological principles, the chemist has been led to call them objective. Let the psychologist dispute him if he can or, out of his possible psychological resources, provide for this oversight of the past.

Naturally, every observed object, as stated, involves cognition. But my contention is that a distinction may be affirmed within cognition between psychological and non-psychological elements or principles of knowledge. This, of course, could not be the case if cogni-

[8] Do not mistake my contention. The chemist does not attempt to say *why* objects manifest the differences indicated. He is merely interested in the result that objects, identified by him as different, do *operate* differently, and to tabulate these *differences in operation* practically exhausts his interest.

tion were not affirmed to be at once distinct from and in part at least *in*-dependent of mere sensational data. My present proof for non-sensational elements of knowledge, observe, does not, however, pause with this more or less deductive type of reasoning. I merely make a demand for an observation of the fact that a psychophysical organism is "neutral" in its capacity to act on a par with the elementary substances in chemistry to produce a *chemical* change, and, secondly, that the psychophysical organism is unable to yield the elements for the differences affirmed to exist between the chemical substances in their reciprocal operations. For these reasons I have been led to assert that the psychophysical organism is like every other object in the universe; that is, it is at once "effective" in respect to some results and "neutral" in respect to others. And it is upon this distinction in the human organism as "neutral" and as "effective" in its relations to different objects, that I would justify the claim of chemistry to eliminate psychology from its cognizance. Cognition or awareness, therefore, has a wider scope than is provided for by the historical development of epistemology. In fact, for the very same reason that philosophy turned to psychology to prove a dependence of certain elements in cognition upon an organism, it should also have turned to other sciences for the proof of elements in cognition not thus psychologically dependent. This I now claim to have opened the way to do. Until we can give in terms of sensations *why* hydrogen and nitrogen are different in respect to water and yet treat them as different, as we do in chemistry, then we must stand ready to admit either that chemistry presents no valid form of knowledge, or that non-sensational elements in the differentiation of objects exist in cognition.

In a similar manner, it can be shown that a *chemical* change distinguishes itself from a merely *mechanical* change by the help of non-sensational rather than sensational principles. Both kinds of change, no doubt, involve the presence of sensational elements; but a *further* differentiation is affirmed to exist between them, and this further differentiation is one that is based upon a difference in objects more properly denoted as functional than structural (substantive) in character. Had chemistry affirmed that the distinction between a mechanical and a chemical change was one that at bottom is metaphysical, the chemist would, without more ado, have put his science at the mercy of philosophy. But chemistry, fortunately, did not thus easily abandon its sphere. Hence, the first distinction that chemistry is actually found to make between a chemical and a mechanical change is that the latter is essentially reversible (as he terms it) whereas the former is not; secondly, that the former involves more heat energy than the latter. Thus we see that even

in his definition of change, a chemist's interest in objects lies primarily in their functional aspect. He accepts the distinctions that he thus makes as final and reliable. After that his sole business is to separate those objects that combine (in accord with the principle of uniformity) in the one way from those that combine in the other way, or in neither way. A psychical change might thus be taken as representative of a type of change neither chemical nor mechanical.

If now we raise the question whether a psychical or a chemical change is the more ultimate, the conflict between monism and pluralism would at once confront us. Without seeking to reopen this issue, all that remains to say is that a psychical event to all purposes is as unique and as distinct an event as a chemical or mechanical one, and, hence, may as validly serve as a basis for a science. It is not surprising, therefore, that certain sciences have arisen in which the attainment of truth has for its prescribed ideal the inclusion of just that psychophysical element which the ideal of the physical sciences seeks to eliminate. Psychology, ethics, esthetics may be cited as some of the sciences falling within the sphere of this latter ideal. Their subject-matter may be subjective, but if expressed in terms of the uniform behavior of objects, the truth achieved is objective. In current usage, however, some truth only is objective and some subjective. Truth, by common agreement, is subjective to the extent in which a psychophysical individual, as an "effective" object, obviously contributes[9] in the production of sense phenomena; but in so far as the individual is not an "effective" condition in a specific production, but a medium of transcription only, to that extent, by common agreement, truth is objective and not subjective. Instead of this definition of objectivity, I would offer the principle of uniform behavior in objects as formulated. Secondly, science has been led to subscribe to the existence of a truth, in the production of which the human organism fails to be "effectively" involved. That such situations exist, is the long-standing claim of the physical sciences; but science has been unable to justify its claim in the face of the contention, advanced by philosophy, that the individual is directly involved in each and every observed situation. Neither has philosophy been able to justify its claim in the face of the methods and the results of science. Both science and philosophy are thus found to be lacking; and their lack is due to the fact that they alike fail to distinguish, and to give the ground for the distinction, between an individual that is "effective" in certain situations and "neutral"

[9] I use the word "contribute," for the reason that every "cause," in my judgment, is *plural* and not *one*, as set forth in my paper on "Causation" in this JOURNAL, Vol. XI., page 655.

in others. The proof thereof demands the acceptance of relativity and pluralism at every point.

III

One objection to the position herein advanced may be met at once. Grant that non-sensational principles of knowledge exist, how avoid subjectivity in knowledge from the standpoint of thought as constitutive,—the claim of so-called objective idealists.

This objection is to be overcome by a purely empirical procedure. The question at issue is: Is every object in its apprehension transformed by thought? This claim, to my mind, stands refuted if we can again empirically show that thought is a principle that is controlled as well as one that controls in our conception of reality. A mere outline of my argument must again suffice.

Suppose we ask the question whether water is simple or complex, one or many. To answer this question we must turn to something else than water. It is "one" from the standpoint of lemonade; "many" from the standpoint of physics or chemistry. If so, it is not left to thought upon its own initiative to apprehend water as either one or many. On the other hand, thought is constrained by an inexplicable behavior among objects, to denominate water as "one" in relation to lemonade and "many" in reference to hydrogen and oxygen.[10] Hence thought is controlled.

Or again: suppose I hold that nitrogen and silver will produce water. How would you expose my error? Merely by challenging me to make my statement good; that is, to produce water from nitrogen and silver. This, of course, I can not do; but water can be produced by the help of hydrogen and oxygen. If so, where does the principle of control lie in the formation of a correct idea in respect to the origin of water? Does it lie in thought as ultimate or in the inexplicable but uniform behavior of objects? And since my aim in passing is merely to suggest to what extent thought is *not* constitutive, this division of my paper may be brought to a close.

The path is now open for grappling successfully with the appearance-reality problem of historic thought.

IV

If reality is assumed to be inherently pluralistic and relativistic, then it follows that reality reveals itself in circumscribed situations only. And since *time* and *varied situations* are alike required in the manifestations of reality, no matter what bit of it we seize upon, then one sample of it, as the product of one situation only or of a series of different situations, is no more real in the abstract than

[10] Hence a so-called "result" would control so-called "purpose." To this extent, therefore, do I venture to correct and supplement much of our current philosophy, particularly pragmatism.

another, or, to state the matter in positive terms, it is just as real. We have no block-universe for our standard. Our only standard is the one that is found in the correlation of a specific result with its specific conditions. The block-universe conception is thus not only superseded as a standard for the attainment of truth, but it is refuted by reality's inherent plurality. It is further refuted by the fact that *time* and *different* situations are required to manifest all the qualities and properties of even the simplest parts of reality. Hence the more complex the reality that is assumed, the more persistently the principle applies, that time and different situations are absolutely necessary for manifesting all its various properties and qualities.

Now, if reality manifests itself in circumscribed situations, why should that product of reality of which the psychophysical individual constitutes a *productive* part, be called an "appearance," and those circumscribed parts of reality that are determined independent of an "effective" psychophysical individual, genuine reality? There is no basis for such a contention, except the false one that the universe and every object in it exist in their isolated abstraction with a prefixed measure and boundary, and that the psychophysical individual, accordingly, is a sheer epiphenomenon as far as his part is concerned in the constitution of that universe. But once admit, as I have tried to establish, (1) that reality at large is not such a prefixed block-universe; (2) that it manifests itself in circumscribed situations only; (3) that the individual as "effective" and "neutral" is but one object among others, and hence as much as any other object an integral part of such universe; and (4) that the contributions made by a psychophysical organism in an object's constitution is of the same general order as the contributions from any other object,—then the appearance-reality distinction as metaphysical, the most persistent delusion of historic thought, vanishes forever, except the distinction be retained for practical reasons.

In fact the appearance-reality distinction, when considered in the light of the relativity herein formulated, converts itself into a thing the very opposite of that claimed for it in our historic development of thought. For if that reality, in which man is more directly involved, is more real for him than a more independent form of it, then the supposed "appearance" of historic thought converts itself into the superior reality, and the supposed "reality" into the inferior.

The conclusions that follow are that civilization with its organized reality is for us of a richer content than less organized reality; and secondly, that the world, as well as the individual, is inherently creative and destructive.

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THE PERMANENT CONTRIBUTIONS OF THE PRAGMATISTS

THE word pragmatism is familiar to all students of contemporary philosophy. So much has been written about it during the last ten years that even the uninitiated must have a pretty definite idea of its aims and assumptions. When, a few years ago, the word pragmatism was first heard in philosophical circles, its denotation was to most of us vague and indefinite. Now, however, after the new doctrine has enjoyed ten years of popularity, it is time to throw a retrospective glance upon the past, and to examine its claims to a permanent place in the history of philosophy.

Let me state at the outset that I do not take the word pragmatism to mean a definite, closed system, nor do I intend to draw a hard and fast line between it and its neighbors. No word in our language expresses a single idea, definitely separated from all others. All our vocables express currents of thought, some stages of which our dictionaries endeavor to stereotype. But the task is impossible. These currents of thought move on; and, in time as well as in space, reflect the instability of their nature. The word ἀγαθός which, among ancient Greeks, meant good, is now translated by their descendants as meaning good-natured, and no doubt it will soon convey the idea of silliness. Even if we confine ourselves to the present time, we are struck by the flowing character of our words. Dictionaries endeavor to take different views of the flow and to give to each word a number of different meanings. But the word itself is the moving unit which no photographic apparatus can represent.

It is not, therefore, to be wondered that the word pragmatism should have embraced at the outset different, nay incompatible ideas. It is well known that the man to whom the paternity of pragmatism has been so repeatedly attributed, Charles Peirce, frightened at the apparent transformation of his child, refused to recognize him any longer, and enriched philosophical dictionaries with the name pragmaticism, which, in order to avoid confusion, he destined to the original—and, according to him, sole legitimate—form of his offspring. William James himself, although less timid, did not fail to recognize the progress of the doctrine with which his name had been so gloriously associated. When Schiller, in his volume on Humanism, so developed the pragmatic ideas as to convert them into a complete philosophical system, William James, although he defended with all his main his English confrère, could not but see that there was an abyss between such a humanism and his own original, timid principles.

Nor do I believe that a satisfactory list of pragmatic philosophers could be drawn. William James no doubt identified the word prag-

matism with his own philosophical achievements. But it is a remarkable fact that none of the other philosophers we generally classify with him has done so. So far as I know, Professor Dewey has never called himself a pragmatist. As for Henri Bergson, it has been repeatedly asserted that he is not one: "M. Henri Bergson n'est pas pragmatiste," wrote Chaumeix, "on ne trouve chez lui ni le mot ni la chose." When, a few years ago, Mr. Pitkin pointed out, in this JOURNAL, some points of divergence between the doctrines of James and Bergson, the author of the "Evolution créatrice" came bravely to the rescue of his American confrère and the discussion was apparently closed. It is, however, significant that many students of philosophy were not convinced and obstinately refused to classify Bergson as a pragmatist. On the other hand, P. Nève, in a remarkable essay on the philosophy of Bergson, which appeared in the first volume of the "Annales de l'Institut supérieur de Philosophie," sees in Bergson's philosophy the definite, permanent form of pragmatism, the form which is destined to endure and to have a permanent place in the history of philosophy.

The truth is that all classifications are creations of our mind, manufactured for practical purposes, and, therefore, they are to some extent untrue. Each philosopher is but his own self. He has his own philosophical system, more or less consistent, more or less profound; a system, however, which is different from all others, and, only for practical purposes, can be assimilated with neighboring currents of thought. And this is why philosophers hate to be classified. They feel that an injustice is done to them. James lived and thought and had a conception of the universe. The same is true of Dewey and Bergson. Each one has his own system, differing, in many respects, from all others. Strictly speaking, pragmatism does not exist.

When I speak, therefore, of the permanent contributions of the pragmatists, I simply mean some permanent contributions to philosophy made in modern times, and chiefly insisted upon by some philosophers whom we more or less arbitrarily classify as pragmatists.

When William James began to popularize pragmatic ideas, he described pragmatism as being simply a method for judging of the truth of doctrines through their practical consequences. Pragmatism stood for no philosophical system whatsoever, and the Italian Papini, bolder than his master, likened it to a corridor which opens into all systems of philosophy. Not long afterwards, Professor Lovejoy was able to describe thirteen forms of pragmatism.

The essential character of pragmatism was, however, according to William James, its consideration of practical results. "The pragmatic method is primarily a method of settling metaphysical disputes that otherwise might be interminable. Is the world one or many?—

fated or free?—material or spiritual?—here are notions either of which may or may not hold good of the world; and disputes over such notions are unending. The pragmatic method in such cases is to try to interpret each notion by tracing its respective practical consequences.''[1] And the principle that ''the true is that which works'' seemed at first to take the world by storm. But its glory soon faded away. At the Congress of Heidelberg, in 1908, pragmatic doctrines met with decided hostility. According to Dr. Itelson, pragmatism is the philosophy of those who are not philosophers ''nur Laien kann der Pragmatismus gefallen.'' And at the same Congress, pragmatism was described as a kitchen-philosophy '' Pragmatismus ist eine Küchenphilosophie.'' More recently, at the International Congress of Philosophy of Bologna, there arose the general impression that Schiller was not even taken seriously. And now, only five years after the death of William James, who is not struck by the contrast between the noisy reputation he so rapidly acquired during his life and the silence which now reigns around his tomb?

Let us frankly confess the truth. Of all the aspects of pragmatism, the one which James mostly emphasized, namely, the consideration of practical results, is precisely the one that is bound to disappear. It has been pointed out by a French philosopher, whom pragmatists occasionally classify as one of their number, Gaston Milhaud, that the disinterested character of scientific speculation is an essential condition of its progress. As long as mathematics, in the hands of the Egyptians, were directed toward practical results, they remained stationary. When, however, the Greeks, neglecting practical results, applied themselves to pure, disinterested speculation, gigantic progress was made, and seemed always to be in a direct ratio with the degree of disinterestedness and the purely speculative character of the scientific researches.

Among the permanent contributions of the pragmatists, there are two which I regard as most important. One of them is the temporal character of reality, as contrasted with the eternal, immutable character of the same described by the absolute idealist of the last century. The other is the human element in the building up of reality.

The first of these contributions does not belong to pragmatism alone. It is a tendency found in all contemporary thought. Nobody perhaps has pointed it out more clearly than Professor Woodbridge, whom no one would classify as a pragmatist. According to Woodbridge, the theory of the absolute idealist was connected with the physical discoveries of Newton and the astronomical achievements of Copernicus and Laplace. In virtue of these achievements, space was regarded as the real being, in terms of which all cosmic phenomena were to be described. Duration came to be regarded as

[1] James, ''Pragmatism,'' page 45.

non-essential and dismissed from the philosophical platform. And there were written, inspired by such ideas, Kant's "Kritik der Reinen Vernunft" and Addison's hymn "The Spacious Firmament on High." Now, on the other hand, since Darwin has turned the attention of scientists toward the evolutionary character of reality, the conception of space has ceased to be a dominant conception and time has made a solemn entry into the realm of philosophy. It is the world as becoming, not the world as "all there," which philosophers are now found to consider. It is Darwin's picture which has replaced Newton's.[2]

In point of fact, the theories of the absolute idealist can be traced back to a far remoter past. Since Parmenides drew a hard and fast line between the real world and the world of appearance, the conception of a permanent, immutable reality which persists behind the fleeting phenomena has found a place in the philosophical systems of all ages and all nations. In ancient Greece, there appeared Plato with his world of ideas, and, during the Middle Ages, the schoolmen, developing Aristotle's theory of the pure act, rose to the conception of an eternal, immutable Absolute, which alone is, and in which all cosmic phenomena, all worldly changes, have their being and their ultimate cause. The Hegelians have a similar conception of the Absolute. But whereas the God of the Scholastics was knowable to the human mind only to a limited extent, the Hegelians have come to the belief that, by analyzing the logical elements of thought, they can unfold the Divine Nature and discover its arcana. Nobody, by the way, has pointed out more clearly than Professor Dewey that such a subtle anthropomorphism is the stumbling-block of the Hegelian philosophy.

Pragmatists have been unanimous in discarding the idea of an immutable Absolute and in directing their attention to the flowing character of reality. Bergson, in particular, has given, in his "Evolution créatrice," a philosophy of evolution of which the conception of duration can be considered as the backbone.

This shifting of the philosophical point of view has wrought a transformation in our conception of thought and its relation to the rest of things. Since the days of Descartes, a chasm had appeared between the mind and the external world, which nobody had been able to span. And the ghost of solipsism was there, and nobody was able to drive it away. But now that thought has become an event in the world's history, to the same degree as a storm or an earthquake, the problem of the bridge between the mind and the world is bound to disappear as meaningless. This is why Professor Dewey simply sketches the natural history of thought in its evolution, start-

[2] *Cf.* Woodbridge, "The Problem of Time in Modern Philosophy," this JOURNAL, Vol. VII., pages 410 *seq.*

ing with the antecedents of thought, then passing to the datum of thinking, ending finally with the content and objects of thought.

The other permanent contribution of the pragmatists to philosophical thought does not appear upon the platform of any other system, and may, therefore, be regarded as its exclusive property. It is, as we have already hinted, the human element in the building up of reality.

When, for the first time, our remote ancestors formulated the laws of nature, they believed they had deciphered a page of the eternal truth. For centuries they prided themselves upon having discovered the ideas of the Infinite. But, in the course of time, their joy was brought to an end. The laws they had formulated were rejected, and new principles advocated, more in harmony with recent scientific discoveries. The new laws partook of the same fate, and at last men, delivered forever from the presumption of their ancestors, came to consider scientific laws and formulas as hypotheses, which could be accepted only temporarily, as guides in the discovery of new truths. This is why pragmatists reject all descriptions of truth as eternal and immutable, and insist upon the part played by man in its creation.

When we reject an old law and put a new one in its stead, we do not thereby affirm that the old law was false and that the new one is true. Both are true to a certain extent. Both have the same right to be considered as scientific, in so far as they account for established facts and lead us to the discovery of new truths. Both are only temporary in character, because there is always present the possibility of new discoveries which will make a new formula imperative. The Ptolemaic system of the universe was as strictly scientific as the Copernican system. By its means, the ancients accounted for the different positions of the planets. They did so by referring them to the earth as to a center. To-day, based upon the principle that the earth moves around the sun and that the sun is motionless, we account for the same positions of the planets by referring them to the sun. But the motionless character of the sun is only a fiction, and possibly some day a new cosmical theory will replace the heliocentric system, which, although more perfect than the Ptolemaic, is nevertheless to a certain extent arbitrary.

The same arbitrary character is found in all other sciences: in biology, in history, in philology. In them all we classify for convenience sake, following the bent of our intelligence which could not otherwise embrace reality. In biology, we divide living beings into animals and vegetables. But we are bound to confess that between the animal and the vegetable kingdom no hard and fast line can be drawn. We are even at a loss when we want to formulate any essential characteristic which distinguishes the one realm from the other.

According to the scholastics, the animal is that which moves itself. But many beings endowed with motion are classified as vegetables. Without mentioning the insectivorous plants, which are able to get hold of insects and to digest them, we are all aware of the fact that many bacteria are endowed with free and spontaneous motion. And yet bacteriologists are unanimous in classifying them as belonging to the vegetable kingdom.

Nowadays biologists have come to the conclusion that the most characteristic difference between the animal and the vegetable kingdom lies in the mode of alimentation. The vegetable is able to assimilate simple elements, whereas the animal feeds upon organized bodies. But here again, many cases can be adduced in which the law does not hold. Although bacteria are able to obtain their nourishment from much simpler chemical substances than most animal cells, yet they can not use some of the substances which are assimilable by the green plants. Moreover, who ignores that the drosera, the dionæa, and the pinguicula can feed upon insects, and that mushrooms have the same mode of alimentation as animals.

This arbitrary character of scientific truth is found not only in general laws. In all our perceptions we choose between images, we accentuate some, we neglect others, although they all possess the same interest in so far as pure knowledge is concerned. We thus more or less arbitrarily divide the material world into independent bodies. But their independence is fictitious and created by ourselves for practical purposes. And thus, as James puts it, the world is really malleable, waiting to receive its final touches at our hands. Man engenders truths upon it.

The Italian pragmatist, Papini, enthusiastic at the sight of this newly discovered rôle of man in the building up of the body of scientific truth, grew dithyrambic over the view that it endows man with creative, divine functions. Bergson is more modest. According to him man, it is true, creates the world of science. But, in so doing, he deforms reality to a certain extent. And the function of philosophy is, therefore, to undo what science has done; and, forgetting that we are intelligent beings, to try to penetrate by means of instinct into the pure, virgin reality which the hand of man has not touched.

Pragmatism has conquered a permanent place in the history of philosophy. Some of its early contributions are, in my opinion, destined to die; and I would place among these the belief that the truth of a theory is to be found by tracing its respective practical consequences. But the pragmatists will ever have the glory of having pointed out the human element in the building up of the body of scientific truths. To them belongs the honor of having accurately expressed the value of hypothesis in science. Moreover, they have

insisted upon the importance of time in all philosophical accounts of reality, and have thereby associated their name with the philosophy of evolution.

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REVIEWS AND ABSTRACTS OF LITERATURE

Science and Religion: the Rational and the Superrational. CASSIUS J. KEYSER. New Haven: Yale University Press. 1914. Pp. i + 75.

In this little book, which represents an address delivered on May 4, 1914, before the Phi Beta Kappa alumni in New York, Professor Keyser gives us a remarkably interesting and stimulating account of the relations between science, religion, and the extent of human knowledge, as seen from the point of view of an expert in the theory and technique of modern mathematics. He starts out by distinguishing scientific from religious knowledge in that the former deals with "a certain group of concepts, together with the relations that bind them into a logically organic whole," while, at bottom, religion is "a complex of emotions felt in their integrity," and "does not belong to the rational domain, does not pertain to the field of logic." To put the same idea into other words, scientific knowledge is connotative, religious knowledge is denotative, and therefore logic, which is the science of the interconnections of connotations, is irrelevant to religion. As the author shows, the scientific knowledge of religion is a far different matter from the knowledge of religion which the religious man possesses, for, though the subject-matter of the knowledge may be the same in both cases, the former is knowledge *about* its subject-matter, while the latter is acquaintance with its subject-matter. Professor Keyser gives a very interesting and very thorough discussion of this point, though, with perfect justice, he lays considerable emphasis on the fact that in our actual life these two elements—the direct awareness we have of our own feelings, and the scientific, descriptive, connotative knowledge which we may have even of religious experience—are closely intermingled.

The next thesis considered in the book is "that human ignorance is a necessary condition for the existence of religion." Professors Gilbert Murray and Shotwell are mentioned as advocates of this view, which is discussed in connection with the other familiar opinion that human knowledge is destined to develop beyond all bounds. Professor Keyser deems this latter tenet characteristic of the present age, but is not convinced of its soundness. Leaving all questions as to the validity of this view aside, however, he holds that in some more or less metaphorical sense, the amount of the unexplored in the universe—which, according to a view just mentioned, forms a necessary factor for the existence of religion—is infinite. He points out, in accordance with the Tristram Shandy paradox of Mr. Bertrand Russell (whose name is accidentally not mentioned in this connection), that the infinitude of the unknown in the universe and the fact that at no time will the human intellect have

exhausted it, may be perfectly compatible with the hypothesis that every single fact in the universe will be learned sooner or later. He also indicates that "it is far from evident that, for the intellect of man, every specific knowable is convertible into a known," while he puts forward the further claim: if it be granted that the sum total of human knowledge is not capable of being extended so as to include any part of the universe you please, though the possibility still might remain that the sphere of the humanly knowable is infinite, though not all-inclusive, even this reduced assumption concerning the unbounded extent of the humanly knowable is extremely questionable. He next presents the alternative view that though the sum total of the humanly knowable might be finite, human knowledge might go on forever approaching it asymptotically. How this alternative is to be distinguished from the last is somewhat difficult to make out, since, by the author's own confession, we are using terms of measurement such as "finite" and "infinite" in an extremely metaphorical and loose sense.

Professor Keyser now returns to the discussion of the hypothesis that the humanly knowable is infinite and includes the whole universe, combined with that assumed throughout up to this point: that religion depends upon human ignorance. He claims that it is possible for the *quantity of the unknown,* which has been assumed to form the basis of religion, to remain absolutely unchanged, on account of the infinitude of the unknown, though every item of fact in the universe becomes known at some time or other. He brings out the difficulties which would ensue were the future duration of the human race on this planet finite, or were time cyclical in its course, and not, so to put it, rectilinear. Herewith he closes the first and most satisfactory part of his argument, which, even if it is too metaphorical to have settled anything finally, is a most interesting discussion of the relations of the known to the unknown. The conclusion is that under none of the hypotheses already considered does any conflict arise between the "limitless progressibility of human knowledge" and the view that religion "essentially depends for sustenance upon human ignorance."

This latter view is now denied. Professor Keyser's chief reason for denying it is by no means satisfactory. It is this: an omniscient being, on the theory that religion depends on ignorance, having no ignorance, can have no religion. But, says the author, religion furnishes one with certain experiences that the non-religious being could not have, so that if a being is omniscient, and consequently possesses all possible experiences, it must possess these experiences, and must consequently have a religion. Professor Keyser sees a contradiction in these two conclusions —that an omniscient being, on the one hand, must not have a religion, and that, on the other hand, an omniscient being, must have a religion— and argues on the basis of this contradiction that the theory that religion depends on ignorance is false. But this argument is fallacious, for the two conclusions in question are perfectly compatible, *provided that there are no omniscient beings.* Now, the author gives no grounds whatsoever for belief in the proposition that there are omniscient beings, and indeed,

it is extremely improbable that there are beings which are omniscient *in the sense that they possess every possible experience, or even every possible kind of experience,* which are the only senses of "omniscient" that are relevant in this context. In addition to this inadequate argument on the basis of logic against the view that religion depends upon ignorance, several more satisfactory arguments to the same effect are urged on the basis of common sense, and it is shown that neither the rise and fall of creeds with the growth of knowledge nor the more intimate changes induced by the same cause in the religious emotions suffice to prove the statement that "ignorance is the *fons et origo* of the religious emotions," which Professor Keyser categorically states to be false.

Now comes the crucial point of the book: the statement, namely, that "the rational implies and reveals the superrational," and that the universe is not exhausted by the domains of sense or reason, but contains "a realm into which logic can not go." To support this, the author introduces an argument from a mathematical analogy—that of limit. He points out the fact that a sequence of terms, such as the sequence of inscribed regular polygons in some circle, taken in order of magnitude, may indicate as its limit a term—the circle—to which the members of the sequence approach as close as you please, though they never attain it. Another example he gives is that of the square root of two—this is not a rational number, but may be made the limit of a sequence of rational numbers. Professor Keyser claims that a domain of "objects or spiritual entities" may give us a clue to the nature of those entities outside it which are limits of sequences of entities contained in the domain, and he points out that the collection of these latter entities may be infinitely richer than the original domain in which lie the sequences of which they form the limits. In this manner, he claims, objects of reason, such as geometrical shapes, are limits of sequences of objects of sense, such as the forms that we see, and further, entities belonging to the superrational form the limits of sequences of objects belonging to the realm of the rational, while the realm of the superrational may still be richer than that of the rational. As examples of objects thus defined, the universe, considered as a class including, among other things, all classes as its members, is mentioned, and, on the other hand, such notions as that of omniscience.

In this whole discussion, the author's arguments are by no means adequate. One of the chief services of the modern mathematical logicians is to have pointed out that no entirely new realm can be discovered as the limiting realm of regions already given. For example, it has been shown by Cantor, Dedekind, and Weierstrass that one can not say that a sequence of rational numbers has an irrational limit until, by a method not involving the use of the notion, "limit," one has already obtained access to a domain including both the rational and the irrational numbers. All that the method of limits can do is to lead us from the more explored to the less explored parts of a region which is previously given as a whole; nothing on earth could justify us in saying that the sequence 1, 1.4, 1.41, 1.414, . . . has the limit $\sqrt{2}$, or, indeed, any limit whatsoever,

did we not already have the knowledge of a system including both the members of the sequence and $\sqrt{2}$. The method of limits can lead us from one part to another of a single rational domain, but it certainly can not lead us from one rational region to another—much less from the rational to the superrational. The introduction of the notion of limit in the discussion of the relation of the rational to the superrational, though it may be a suggestive metaphor, should be nothing more than a metaphor.

Furthermore, the particular examples which the author chooses as illustrations of things superrational which are limits of sequences in the realm of the rational are unfortunate. He tries to show the superrationality of the universe in accordance with an argument given for a different purpose by Mr. Bertrand Russell, whose name is again accidentally omitted in this context. Mr. Russell's form of the argument deals with all classes that are not members of themselves—he shows that the class of all classes that are not members of themselves, if it is a member of itself, can not be a member of itself, while if it is not a member of itself, it must be a member of itself. From this, Mr. Russell draws the conclusion that it is illegitimate to speak of a class either as a member of itself, or as not a member of itself, and that any "universe" to which one attributes classes which either are or are not members of themselves, does not merely fail to belong to the realm of the rational, but can not belong to any domain whatsoever—not even to that of the superrational. However, on the assumption that no class is a member of itself, in some perfectly legitimate sense, and that the universe is the class of all classes, after stating what is obviously intended to be Mr. Russell's argument in a form in which it is unnecessarily deprived of all its cogency, Professor Keyser comes to the conclusion that the universe is superrational, on the basis of this argument. He claims that the universe is the limit of a sequence of rational entities in that it is the limit of a sequence of classes that are amenable to the processes of logic, though he leaves us utterly in the dark as to just what his sequence is. He argues on the basis of common sense against any claim which might be raised that the universe does not exist as a whole. This last point is the Achilles's heel of his argument. The tautologous truth that every existent thing exists is no justification whatever for the assertion of the proposition that there is some single aggregate which contains all existent things. Professor Keyser must know how little the first verdict of common sense is to be trusted in mathematics: why should he put more faith in it at this point where the common sense of the greatest living mathematicians has led them to diametrically opposite conclusions? Furthermore, there is no reason whatsoever that will bear the slightest examination which can furnish an adequate justification of our belief in the existence of a class of all classes.

After considering a number of supposed entities of the same general character as the class of all classes, which we have even less reason to consider superrational and existent than the latter, Professor Keyser comes to the notion of omniscience. He claims that not only is the

actual possession of infinite knowledge beyond the reach of man, but even that the human intellect can not grasp the mere *idea* of a being who knows all, and therefore has neither the need nor the ability to acquire knowledge, to think. The author gives no argument whatever to show the existence of an omniscient being, and nowhere gives a precise definition of omniscience, so that his claim that omniscience is an example of a superrational entity, belonging to the boundary of the rational, is hardly established. Furthermore, there is nothing beyond the grasp of the human reason in the *idea* of a being who knows all, and therefore does not think nor need to think, or if there is, our author has not pointed it out.

After finally including absolute beauty and absolute love in the category of those things which are superrational, yet form limits to the world of the rational, Professor Keyser brings "Science and Religion" to a close. The book, notwithstanding its occasional technical inaccuracies, bears witness to an unusual breadth of interest and comprehensiveness of view of the author, and gives the non-mathematical reader a real insight into the relation between the scope of human knowledge and that wonderful realm of infinities which has been opened up by the modern mathematicians.

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Selections from the Scottish Philosophy of Common Sense. Edited with an Introduction. G. A. JOHNSTON. Chicago and London: The Open Court Publishing Company. 1915. Pp. 23 + 238.

This little book, as the title implies, contains selected source material, with an important critical introduction of 23 pages. Of the 238 pages of source material, 168 are devoted to Thomas Reid, 19 to Adam Ferguson, 13 to James Beattie, and 38 to Dugald Stewart.

The first and most important of the Scottish philosophers was Reid. Even Hume recognized the ability of Reid and the power of his criticism. The contemporaries and successors of Reid made little real contribution. Beattie, owing to his vulgar denunciations of the skepticism of Hume, enjoyed a greater popularity. The work of Ferguson betrays a "thinness and lack of originality." Stewart was a popularizer and did much to secure for the Scottish philosophy respect among other philosophers.

The Scottish philosophy of common sense is a protest leveled against the skepticism of Hume. Reid was the only man of his time who really understood Hume. It was he who discovered that the skepticism of Hume was the logical conclusion of Locke's premises. The criticism is really, therefore, directed against Locke. It is a criticism of Locke *via* Hume. This is the true meaning of Higher Criticism, it is higher in the sense of beginning higher up stream, nearer the sources. Locke's philosophy is worked out in terms of the mind-ideas-object scheme. Berkeley had denied the existence of the object, Hume that of the mind; it remained for Reid to deny the existence of Locke's third factor, namely, ideas. Locke's

"ideas," involving a representative theory of perception and a copy theory of knowledge, have, according to Reid, no real existence. By denying the existence of ideas in the Lockeian sense of the word, Reid is enabled to refute the skepticism of Hume, the task constituting the object of his real interest. Thus Berkeley's denial of the object, Hume's denial of the mind, and Reid's denial of ideas involve the destruction of the whole apparatus of Locke's philosophy. Reid is thus enabled to begin the whole work afresh. His point of departure is not with hypotheses, as was the case with Locke, but with the principles of common sense. The philosophy of Reid is constructive as well as critical. The appeal to common sense, that is, to the common and uniform principles of human nature, bears striking analogies to the critical philosophy of Kant. It differs, however, in that Kant's philosophy is epistemological whereas that of Reid, true to the British method, is psychological. Reid's critique of knowledge, like that of Kant's, is opposed to sensationalism. Judgment as a synthetic operation of the mind precedes simple apprehension. Sensations are products of abstraction. Kant's criticism of Reid is based on a misunderstanding, and it is doubted whether Kant had any first hand knowledge of Reid. Reid's theory of knowledge involves a distinction between sensation and perception. Bare sensation never gives knowledge; all knowledge involves perception as an activity of the self, an ultimate principle of human nature.

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JOURNALS AND NEW BOOKS

THE JOURNAL OF ABNORMAL PSYCHOLOGY. December, 1915–January, 1916. *The Sex Worship and Symbolism of Primitive Races, II.* (pp. 297–314): Sanger Brown. – The evidence of the worship of sex is found in the records and monuments of antiquity. Our knowledge of customs and practises of certain tribes indicates the presence of such worship. It is so general and widespread that it may be considered part of the evolution of the human mind. "There is abundant evidence to show that there was a time in the centuries before Christ when prostitution was held as a most sacred vocation." The worship of sex plays a very prominent part in the developing mind of man. "As civilization advanced, the deification of sex was no longer frank and open. It came to be carried on by means of symbolism." Certain philosophers adopted *fire* to represent the male principle, and *water*, the female. *The Psychoanalytic Treatment of Hystero-Epilepsy* (pp. 315–328): L. E. Emerson. – Three cases of the borderline of hysteria and epilepsy are presented to study some of the problems of therapy from the psychoanalytic point of view. *On the Genesis and Meaning of Tics* (pp. 329–359): Meyer Soloman. – The views of the Freudian school are reviewed and the evolutionary, phylogenetic standpoint, and the application of Adler's theory of the neurotic to tics are mentioned. "In the physical aspect of tics we have a specific somatic

manification which if explained should, in a way, be the gateway toward the understanding of the many somatic symptoms which we find in the psychoneuroses and psychoses." Psychology of animals, of children, of primitive races, gives opportunity for studying some somatic and psychic manifestations. The understanding and meaning of genesis of tics "opens the gateway to the elucidation of the origin and significance of the psychoneuros and functional psychoses." *Reviews:* William Healy, *The Individual Delinquent:* JOHN T. MACCURDY. J. J. Putnam, *Human Motives:* L. P. CLARK. E. L. Thorndike, *Educational Psychology, Vol. I.:* E. B. HOLT. H. A. Bruce, *Sleep and Sleeplessness:* ISADOR H. CORIAT. *A Correction. Books received.*

Rockefeller, Jr., John D. The Colorado Industrial Plan. 1916. Pp. 95.

Stepanow, Giovanni. Sogni Indotti: Studio sperimentale sull'influenza degli stimoli acustice sul sogno. Firenze: Reprinted from Psiche. 1915. Pp. 59.

Stepanow, Giovanni. I Fatti storici e la loro realta. Prato: "La Tipografica." 1916. Pp. 28.

Tucker, Beverly R. Nervous Children. Boston: Richard G. Badger. 1916. Pp. 147. $1.25.

Watson, John B. The Place of the Conditioned-Reflex in Psychology. Reprinted from the *Psychological Review,* Vol. XXIII., No. 2. Pp. 89–116.

Yerkes, Robert M. The Mental Life of Monkeys and Apes; A Study of Ideational Behavior. Behavior Monographs, Volume 3, Number 1. Cambridge: Henry Holt and Company. 1916. Pp. 145.

Yerkes, Robert M. Provision for the Study of Monkeys and Apes. Reprinted from *Science,* N.S., Vol. XLIII., No. 1103. Pp. 231–234.

NOTES AND NEWS

AT the meeting of the Aristotelian Society, held on March 6, the president, H. Wildon Carr, in the chair, a paper was read by Professor T. Percy Nunn on "Sense-Data and the Physical Object." The writer criticized the view, held in different forms by Dr. J. E. Moore and Professor Stout, that physical objects are revealed in perception as existences of which we have immediate knowledge, that they are the "sources" of our sense-data. As against this view, he contended that the "source" is not an existence beyond the sense-data, but includes the whole collection of such sense-data as could be directly apprehended by perceiving subjects under different conditions. Nothing, he urged, is gained in "simplicity and naturalness" by invoking admittedly hypothetical "sources" in order to say about them something formally identical with what must in any case be said about indubitable sense-data. For instance, the assumption of

a "source" in order to explain why we attribute real shape to an object creates more embarrassment than it removes. For while it may account for the sense-data that resemble the alleged "source" in shape, it affords no help in accounting for those that do not. So again, the argument that sense-data carry with them a reference to a "source" breaks down when the attempt is made to deal with the problem of hallucination and error. Furthermore, the notion of a "material substratum of phenomena," as used in physical science, does not really involve the assumption of a hypothetical "source." For the molecules (and atoms) of the physicist are simply the molar bodies of every-day experience conceptually reduced in size. Whatever belongs to the latter may belong to the former also. Physical speculation assumes complete continuity between the behavior of molar bodies and of the ultimate constituents of matter.

DR. PAUL SHOREY, professor of Greek in the University of Chicago, delivered the Norman W. Harris Lectures on May 1 to 6 at Northwestern University. The general title was "The Development of Ethical and Spiritual Religion in Greek Literature," the individual lectures being on the following subjects: (1) "Introduction," (2) "Religion and Greek Poetry," (3) "The Religion of Philosophy," (4) "Skepticism and the Spirit that Denies," (5) "The Gospel of Socrates," (6) "The Religion of Julian."

THE New York Branch of the American Psychological Association met in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences on May 1 at Columbia University. The following papers were read: "Some Tests for Vocational Guidance," Mr. Herbert A. Rogers; "The Visibility of the Nerve Current," Mrs. Christine Ladd-Franklin; "Taboos in China," Mr. T. T. Lew; "How Psychanalysis Cures Neuroses," Dr. S. A. Tannenbaum.

PROFESSOR EDWIN L. HOLTON, director of the summer school of the Kansas State Agricultural College, will teach this summer at the Chicago University Summer School and will then take a year for graduate study at Teachers College. During his absence Professor Edward H. Reisner will act as director of the summer school and head of the department of education at the Kansas State Agricultural College.

PROFESSOR JOSEPH JASTROW, of the University of Wisconsin, addressed the Sigma Xi Society of the University of Indiana on March 28 on "The Expression of the Emotions," and delivered the Convocation address at that university on March 29 on "Theory and Practise." On March 29, he gave the Sigma Xi address at Purdue University on "The Sources of Human Nature."

THE Sixteenth Annual Meeting of the Western Philosophical Association was held at Washington University, St. Louis, Missouri, April 21 and 22. The sessions on the first day were devoted to a discussion of "The State."

AT Barnard College, Columbia University, Dr. H. L. Hollingworth has been advanced to the grade of associate professor of psychology.